

UNITED STATES PATENT APPLICATION

OF

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and

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FOR

METHODS AND APPARATUS FOR DETERMINING NON-OBVIOUS SAVINGS IN  
THE PURCHASE OF GOODS AND SERVICES

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## BACKGROUND OF THE INVENTION

### A. Field of the Invention

5 This invention relates to electronic commerce and, more particularly, to an apparatus and methods for determining non-obvious savings in the purchase of goods and services.

### B. Description of the Related Art

10 The Internet has been hailed the marketplace of the future, a result of its accessibility and usability. A computer equipped with a communication mechanism such as a modem and telephone connection is nearly all that is necessary to gain access to the Internet. A program called a browser, such as the Netscape Navigator from Netscape Corporation, makes it a simple task to traverse the vast network of information available on the Internet and, specifically, its subpart known as the "World Wide Web."

15 The architecture of the Web follows a conventional client-server model. The terms "client" and "server" are used to refer to a computer's general role as a requester of data (the client) or provider of data (the server). Under the Web environment, Web browsers reside in clients and specially formatted "Web documents" reside on Internet (Web) servers. Web clients and Web servers communicate using a protocol called "HyperText Transfer Protocol" (HTTP).

20 In operation, a browser opens a connection to a server and initiates a request for a document. The server delivers the requested document, typically in the form coded in a standard "HyperText Markup Language" (HTML) format. After the document is

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delivered, the connection is closed. The browser displays the document or performs a function designated by the document.

5 Every day, more people gain access to the Web, and every day, more of them are shopping online. Online shopping provides a level of convenience they want, need and will soon demand. Electronic commerce or "e-commerce" is the term often used to refer, at least in part, to online shopping on the Web. E-commerce is a unique opportunity for businesses of any size. E-commerce can expand a company's marketplace-and consequently, its customer database. By simply providing a Web server having information on the company's product offerings and the customer database, and linking the Web server to the Web, the company can track visits, sales, buying trends and product preferences-all at the customer level. The company can then present its customers with products they are most likely to buy-on an individual basis. For this reason alone most marketing professionals consider the Web to be one of the best direct marketing tools.

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15 But the number of retailers with online stores is growing exponentially every year, making it increasingly difficult for online shoppers to navigate the Web to locate particular products at the best prices. At one site, called the "Internet Mall," online shoppers can browse through more than 20,000 "virtual stores. " This challenge for consumers also introduces a problem for merchants in designing campaigns to attract consumers to the merchants' Web sites and away from their competitors' sites.

20 Certain known business methods, and conventional implementations of those methods, give consumers greater control over a business deal by permitting consumers to set the price they are willing to pay for selected products and/or services, such as travel

resources like airfare, car rentals, and similar travel commodities. Such methods and implementations, however, do not necessarily provide consumers with the best available price for the products and/or services, and consequently, they do not permit the merchants to claim that they deliver the best available price for a particular product or service.

5 Consequently, consumers may still be paying too much for products and services using these implementations.

There is therefore a need for a system that can attract more consumers to a Web server by delivering on a claim that the merchant offers the best available price for a particular product or service. Such a system not only permits the server to expose more consumers to its products and services but also it permits the server to expose an increasing number of consumers to information such as advertisements for products and services.

#### SUMMARY OF THE INVENTION

15 Methods, systems, and articles of manufacture consistent with the present invention overcome the shortcomings of existing systems by enabling consumers to obtain information on savings associated with travel alternatives. Such methods, systems, and articles of manufacture receive requests from users reflecting travel itineraries, respectively. Each itinerary is analyzed to determine a set of alternative itineraries comparable to the travel itinerary specified in the request based on selected rules associated with travel. Then a value or cost of the input travel itinerary is determined and a value for each of the alternative itineraries is also calculated. The methods, systems,

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and article of manufacture consistent with the present invention then generate a report reflecting the input travel itinerary specified in the request, each of the alternative itineraries, the value for each travel itinerary, and a difference between the value for the travel itinerary specified in the request and each of the alternative itineraries.

5           Such methods, systems, and article of manufacture may also assign geographical coordinates for each of the originating location and the destination in the requested itinerary and generate a set of locations with coordinates located within a predetermined range of the destination based on information from a geographical coordinates database. This operation may also include reducing the range when a number of locations in the set exceeds a predetermined number or increasing the range when a number of locations in the set is smaller than a predetermined number.

10           In accordance with another aspect of the present invention, the user's request may be for any product or service, and a method, system, or article of manufacture enables users to discover non-obvious savings associated with alternatives for the requested product or service.

#### BRIEF DESCRIPTION OF THE DRAWINGS

15           The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate an implementation of the invention and, together with the description, serve to explain the advantages and principles of the invention. In the drawings,

20           FIG. 1 is a pictorial diagram of a computer network in which systems consistent with the present invention may be implemented;

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FIG. 2 shows a computer network containing a client system and a server system;  
FIG. 3 illustrates the retrieval of remote image and text and their integration in a document;

FIG. 4 is a block diagram of the architecture of a savings discovery server in a manner consistent with the principle of the present invention;

FIG. 5 illustrates a savings discovery server and its relationship to other computers in a manner consistent with the principle of the present invention;

FIG. 6 is a flow chart of the steps performed by a savings discovery server in a manner consistent with the principle of the present invention; and

FIG. 7 is an exemplary map showing an alternative travel itinerary offering a non-obvious saving associated with a buyer's request.

### DETAILED DESCRIPTION

Reference will now be made in detail to an implementation consistent with the present invention as illustrated in the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings and the following description to refer to the same or like parts.

#### Introduction

Systems consistent with the present invention enable consumers to locate non-obvious savings in the purchase price of goods and services. Obvious savings are those that are known to most if not all buyers of a particular product or service. For example, in the case of travel, obvious savings include the price effects of advance purchase,

alternative origin and departure times, meeting minimum stay requirements, and choosing air carriers commonly known for low prices (though the infrequent traveler may be unaware of many of these "obvious" savings). Non-obvious savings are those known only by a relative few who have accumulated knowledge in the detailed pricing practices of goods and services, are knowledgeable about non-obvious suppliers such as consolidators / wholesalers, and are willing to search for these savings. For example, in the case of travel, a "seasoned" traveler or travel agent accumulates knowledge about the price effects of alternative origin/destination, alternative air routing/ticketing configurations, travel packages, and alternative lodging or other itinerary components. Even with this knowledge, there is still the time and energy which must be expended to find the non-obvious savings.

Systems consistent with the present invention permit a buyer, seasoned or occasional, to systematically discover and take advantage of non-obvious savings just as if he or she had the services of a seasoned buyer or buyer agent by his side. Systems consistent with the present invention are pre-programmed with non-obvious pricing knowledge and automatically apply this knowledge to search for non-obvious savings. Such systems conduct this search by performing non-obvious re-configurations of goods and services and/or checking the prices of non-obvious suppliers of pre-packaged goods and services. They go a step further than even the seasoned buyer or buyer agent by requesting just-in-time "best offer" price quotes from suppliers, thereby creating a type of online, last-minute auction. In the case of travel, for example, a non-obvious product re-configuration would include: 1) alternative flight origin or destination cities; 2)

alternative lodging accommodations; and 3) splitting a connecting flight itinerary into two tickets. Also in the case of travel, non-obvious suppliers would include: 1) travel consolidators / wholesalers; and 2) pre-packaged tours. In one implementation, a network accessible system such as the Internet, client/server, personal digital assistant (P.A.), or voice telephony, can be used for consumers, to access and retrieve information in a manner consistent with the present invention.

The systems consistent with the present invention can be pre-programmed with a variety of savings discovery "rules-of-thumb." For example, in shopping for travel, the rules of thumb might be to check alternate origin/destination airports, alternate times of day, alternate lodging. The systems may also contain fundamental geographic and proximity-based search capabilities for situations where price is influenced by location. They may be able to automatically relax search constraints based upon a buyer's priorities. For example, in the case of lodging, a free continental breakfast may be a lower priority requirement than having an indoor swimming pool. Consequently, they offer the uninformed, occasional buyer the same savings discovery power as the seasoned buyer or buyer agent.

#### Network Architecture

Figure I illustrates a conceptual diagram of a computer network 100, such as the Internet. Computer network 100 comprises small computers (such as computers 102, 104, 106, 108, 110 and 112) and large computers (such as servers 120 and 122). In general, small computers are "personal computers" or workstations and are the sites at which a human user operates the computer to make requests for data from other



computers or servers on the network. Usually, the requested data resides in large computers. In this scenario, small computers are clients and the large computers are servers.

5 In this specification, the terms "client" and "server" are used to refer to a computer's general role as a requester of data (client) or provider of data (server). In general, the size of a computer or the resources associated with it do not preclude the computer's ability to act as a client or a server. Further, each computer may request data in one transaction and provide data in another transaction, thus changing the computer's role from client to server, or vice versa.

10 A client, such as computer 102, may request a file from server A 120. Since computer 102 is directly connected to server A 120, for example, through a local area network, this request would not normally result in a transfer of data over what is shown as "network" of FIG. 1. The "network" of FIG. 1 represents, for example, the Internet, which is an interconnection of networks. A different request from computer 102 may be  
15 for a file that resides in server B 122. In this case, the data is transferred from server B 122 through the network to server A 120 and, finally, to computer 102. The distance between server A 120 and server B 122 may be very long, e. g. across continents, or very short, e. g. , within the same city. Further, in traversing the network the data may be transferred through several intermediate servers and many routing devices, such as  
20 bridges and routers.

~~FIG. 2 shows, in more detail, an example of a client-server system interconnected through network 100. In this example, a remote server system 222 is interconnected~~

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5 through network 100 to client system 220. Client system 220 includes conventional components such as a processor 224, memory 225 (e. g. RAM), a bus 226 which couples processor 224 and memory 225, a mass storage device 227 (e. g. a magnetic hard disk or an optical storage disk) coupled to processor 224 and memory 225 through an I/O controller 228 and a network interface 229, such as a conventional modem.

10 Server system 222 also includes conventional components such as a processor 234, memory 235 (e. g. RAM), a bus 236 which couples processor 234 and memory 235, a mass storage device 237 (e. g. a magnetic or optical disk) coupled to processor 234 and memory 235 through an I/O controller 238 and a network interface 239, such as a conventional modem. It will be appreciated from the description below that the present invention may be implemented in software which is stored as executable instructions on a computer readable medium on the client and server systems, such as mass storage devices 227 and 237 respectively, or in memories 225 and 235 respectively.

#### Distributed Document Retrieval

15 The Internet consists of a worldwide computer network that communicates using well defined protocol known as the Internet Protocol (IP). Computer systems that are directly connected to the Internet each have a unique address consisting of four numbers separated by periods such as " 192. 101. 0. 3 ". To simplify Internet addressing, a "Domain Name System" was created that allows users to access Internet resources with a simpler alphanumeric naming system. For example, the name "travelocity. com" is the name for a computer operated by The SABRE Group, Inc.

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To further define the addresses of resources on the Internet, a Uniform Resource Locator system was created that uses a Uniform Resource Locator (URL) as a descriptor that specifically defines a type of Internet resource and its location. URLs have the following format: "resource-type:Hdomain. address/path-name. " The "resource-type" defines the type of Internet resource. Web documents, for example, are identified by the resource type "http", which indicates the protocol used to access the document.

To access a document on the Web, the user enters a URL for the Web document into a browser program executing on a client system with a connection to the Internet. The Web browser then sends a request in accordance with the HTTP protocol to the Web server that has the Web document using the URL. The Web server responds to the request by transmitting the requested object to the client. In most cases, the object is a plain text document containing text (in ASCII) that is written in HTML. Such objects often contain hyperlinks to other Web documents. The Web browser displays the HTML document on the screen for the user and the hyperlinks to other Web documents are emphasized in some fashion such that the user can selected the hyperlink.

In some instances, the HTML document may contain data from more than one server. For example, FIG. 3 illustrates the retrieval of remote text and images and their integration in a Web document by a client system 340. In FIG. 3, server A 310 contains an image 315, server B 320 contains a combination of text and image data 325 and server C 330 contains text data 335. Each of these servers is remotely located from the other servers and client 340. The transfer of data is via network 100. It should be appreciated

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that the text and image files could be located in the same server which is remote from client 340.

Different techniques are available to display these types of composite Web documents. For example, a program called a servlet executing on one of the servers may combine data from the various servers referenced in a selected Web document and transmit the composite Web document to the client. In other configurations, the client may utilize a program called an applet, which may be transmitted to the client from one of the servers, to access the multiple servers offering parts of the composite and to build the composite Web document.

### System Architecture and Operation

Systems consistent with the present invention employ a savings discovery server, for example, the server 400 shown in FIG. 4. Server 400 is connected to a network interface 445 that facilitates communication with buyers, traders, and suppliers on the Internet. Server 400 includes a number of components, savings business logic processor 405, component supplier system interface 410, geocoding processor 415, proximity search processor 420, buyers' requests datastore 425 and traders' datastore 430, search constraint relaxation processor 435, and mapping processor 440. The operation of each of these components will be explained below with reference to FIGs. 5 and 6.

Figure 5 shows a savings discovery server 400 and machines distributed in the network having facilities such as interfaces for a buyer, trader, and supplier to communicate with server 400. FIG. 5 illustrates an example of this configuration with buyer interface 510, trader interface 520, and supplier interface 530 communicably

connected to savings discovery server 400. Suppliers provide information on available inventory, such as seats available on scheduled flights, rooms available in hotels, cars available at airports for rental, and similar travel resources. Traders, on the other hand, are "consolidators" of travel resources that either buy the resources from suppliers in bulk at discount prices for resale or package various resources to resale. In many instances, traders may have the best available price for travel resources, even better than the price offered by a supplier for the same resource. Although the figure shows only one trader interface and only one supplier interface, the principles of the present invention contemplate many such interfaces.

In operation, server 400 receives requests from buyers for travel resources; receives price and availability information from various suppliers and traders; sends just-in-time "price-to-beat" messages to the suppliers and traders asking for their last minute best offer; and automatically re-configures and re-prices alternative configurations of the original product request and presents the information to the buyers. Underlying capabilities include geographic data encoding (geocoding), geographic/proximity-based searching, mapping, and search constraint relaxation.

Buyer interface 510 allows each buyer to input product and service requirements such as ~~preferred locations, dates, components, and prices to beat~~. A buyers' requests datastore 425 persistently stores buyers' requests for subsequent access/marketing analysis.

Trader interface 520 and supplier interface 530 allow product and service traders and suppliers to input, configure, target, and maintain products, including prepackaged

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products and services in a traders' datastore 430. This datastore contains pre-packaged offerings of products and services that have been pre-configured and pre-negotiated by traders such as consolidators and wholesalers.

5 Receipt of buyer's request 201 by savings discovery server 400 triggers savings  
SLP 405 ~~business logic processor 405 into action to serve as the main process control, apply the~~  
~~pre-programmed non-obvious savings knowledge, and orchestrate the search for non-~~  
~~obvious savings. Savings response 10 1 is transmitted back to buyer interface 510 via~~  
network interface 445.

10 FIG. 6 is a flow chart of the operations performed by server 400. At step 600, the  
buyer (or buyer's agent) logs on to savings discovery server 400 via network interface  
445, creates buyer's request 201 via buyer interface 510. The buyer can then disconnect  
15 from the server/network while the request is being processed and later reconnect to  
receive a response. Buyer request 201 is generally composed of information such as  
origin and destination addresses; other travel itinerary details such as dates, times,  
connect points, lodging address/amenities/class, rental car type/amenities; prices for air,  
lodging, and rental car; and proximity tolerances for the origin and destination addresses.  
Buyer's request 201 is also stored in buyer's request datastore 425 for subsequent  
access/marketing analysis.

20 At steps 610 and 620, savings business logic processor 405 calls upon the services  
of geocoding processor 415 to attach geocodes (for example, latitude and longitude or  
similar information identifying location) to the origin and destination addresses. Savings  
business logic processor 405 calls upon the services of proximity search processor 420, in

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5 conjunction with component supplier system interface 410, to communicate with supplier interface 530 for airports and lodgings within the proximity tolerances specified in the buyer's request 201. Further, savings business logic processor 405 uses search constraint relaxation processor 435 to "relax" constraints of the buyer's request 201, such as the lodging amenities constraint, and test whether this relaxation will lower the total travel cost, such as price of the lodging travel component in this example.

At step 630, savings business logic processor 405 checks the air itinerary of buyer request 201 for a connecting routing. If present, the connecting itinerary is split into two separate origin and destination segments.

10 At step 640, savings business logic processor 405 searches traders' datastore 430 for pre-packaged opportunities 645 that meet the requirements of buyer's request 201.

15 At step 650, savings business logic processor 405 checks the price and availability of the components of the requested itinerary and all alternative travel components and re-configured itineraries generated by steps 610, 620, 630, and 640. Any that are not available are removed from further consideration. The availability and price request is illustrated in FIG. 5 as the arrow 103 from savings discovery server 400 to supplier interface 530. The response to availability/price request 103 is illustrated in FIG. 5 as the arrow 150 from supplier interface 530 to savings discovery server 400.

20 At step 660, savings business logic processor 405 determines the lowest price of all components that have been identified and are available at this point. These lowest prices are formatted as price-to-beat messages 105 and sent to trader interface 520 and supplier interface 530 via component supplier system interface 410 and network interface

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5 445. Traders and suppliers conduct analysis to determine if they want to respond with prices equal to or less than the price conveyed in price-to-beat messages 105. If they wish to respond, traders and suppliers format just-in-time offerings 301 and send them to savings business logic processor 405 via network interface 445 and component supplier system interface 410.

SLA7 At step 670, savings business logic processor 405 re-prices the re-configured travel options, taking into consideration all alternative airports, routings, lodgings, pre-packaged tours, and just-in-time offerings.

10 At step 680, savings business logic processor 405 identifies and sorts the repriced travel options that are lower than the original price conveyed in buyer request 201. Those not lower are deleted in step 690. Those travel options that are lower are presented to the buyer in step 685 as savings response 10 1 via buyer interface 5 10 and network interface 445. Savings business logic processor 405 uses mapping processor 440 to portray savings response 10 1 geographically on a map. Such a map enables the buyer to select from the low-cost alternatives by visualizing the differences. For example, how significant is an alternative flight plan (including, for example, flying in and out of different airports and at different times) or the location of an alternative hotel (staying at a hotel inside or outside a destination city). FIG. 7 illustrates an example of a map produced by mapping processor 440. Travel routes 710 and 720 show two alternative routes along with their respective prices. In this example, a buyer requesting an itinerary from Jefferson City to Dallas could save \$224. 76 by driving to Kansas City.

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The following is a example of the report available to the buyer that demonstrates the "non-obvious savings" offered by a system configured in accordance with the present invention.

<u>Option</u>	<u>Source</u>	<u>Air</u>	<u>Hotel</u>	<u>Car</u>	<u>Total</u>	<u>Savings</u>
1	Package 1	533.0	236.0	150.0	919.0	181.0
2	Package 2	533.0	248.0	150.0	931.0	169.0
3	Package 3	533.0	254.0	150.0	937.0	163.0
4	alto&D/ Alt Lodging	340.76	178.0	100.0	618.76	481.24
5	Alt O&D Alt Lodging	340.76	178.0	100.0	618.76	481.24
6	Alt O&D/ Alt Lodging	340.76	178.0	100.0	618.76	481.24
7	Alt O&D/ Alt Lodging	317.0	178.0	100.0	595.0	505.0

### Conclusion

As explained, systems consistent with the present invention permit a buyer, seasoned or occasional, to systematically discover and take advantage of non-obvious savings just as if he or she had the services of a seasoned buyer or buyer agent by his side. Systems consistent with the present invention can be pre-programmed with nonobvious pricing knowledge and automatically apply this knowledge to search for nonobvious savings. Such systems conduct this search by performing non-obvious re-configurations of goods and services and/or checking the prices of non-obvious suppliers of pre-packaged goods and services. They go a step further than even the seasoned buyer or

buyer agent by requesting just-in-time "best offer" price quotes from suppliers, thereby creating a type of online, last-minute auction.

5 For examples systems consistent with the present invention provide information on low cost travel alternatives by presenting consumers with options for selecting alternate airports when originating or arriving at an alternate airport can save money, For example, travelers flying in and out of Jefferson City, MO can save money by driving 130 miles to Kansas City MO. Another travel alternative presented may be alternate lodging. Sometimes travelers can save money by picking an alternate hotel; systems consistent with the present invention find lower-priced (but similar) accommodations within 1 or 2 miles of a traveler's original planned hotel or appointment. Travel packages offer another source of low cost travel alternatives. Travelers needing air, car, and lodging can sometimes qualify for existing prepackaged deals available in such sources as the SABER Tour guide offered by The SABER Group, Inc. Additionally, splitting tickets may offer cost savings in travel. For example a traveler can save money by converting a ticket with a connecting itinerary into two tickets, each having one segment of the original itinerary. To illustrate further, the H fare from Jefferson City MO to San Francisco might be sold out, but still available for Jefferson City MO to St. Louis and St. Louis to San Francisco.

20 The foregoing description of an implementation of the invention has been presented for purposes of illustration and description. It is not exhaustive and does not limit the invention to the precise form disclosed. Modifications and variations are possible in light of the above teachings or may be acquired from practicing of the

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